Crystal pressure

HPC40 Series Calibrator psi

ACCURACY • PRESSURE MEASUREMENT

psi (Gauge Pressure)

▶ **18 to 28° C**

0 to 30% of Range: **±(0.01% of Full Scale)**

30 to 110% of Range: **±(0.035% of Reading)**

Vacuum*: **±(0.05% of Full Scale**)**

▶ **-20 to 50° C**

0 to 30% of Range: **±(0.015% of Full Scale)**

30 to 110% of Range: **±(0.050% of Reading)**

Vacuum*: **±(0.05% of Full Scale**)**

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.

All models indicate vacuum, *but vacuum specification applies to 30, 100, and 300 psi models only.*

Not recommended for continuous use at high vacuum. *Refer to XP2i-DP data sheet for gauges that are intended for continuous high vacuum use.*

The BARO option allows you to toggle between gauge and absolute pressure.

* Applies to 300 psi and lower ranges only. Vacuum Range = -14.5 psi.

** Full Scale is the numerical value of the positive pressure range.

psiA (Absolute Pressure with BARO Option)

▶ All absolute accuracies are equivalent to the gauge pressure accuracies, except as noted below.

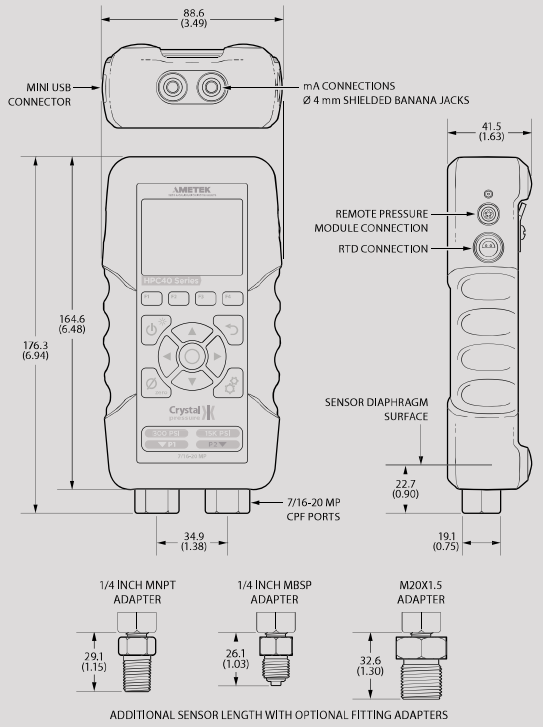
30 psi Range: **Gauge Accuracy + 0.005 psiA**

100 psi Range: **Gauge Accuracy + 0.002 psiA**

ADVANCED PRESSURE MODULES

We offer a range of fully calibrated Advanced Pressure Modules to supplement the HPC40 Series' built-in pressure sensors. Full scale pressure range is from 30 to 15 000 psi, with accuracies from ± 0.025 % rdg, and fully temperature compensated from -20 to 50 °C.

APM CPF Series Pressure Modules



DIFFERENTIAL PRESSURE

The Tare function can improve differential pressure measurement uncertainties. Requires the use of an equalizing valve.

Full Scale Range of Both Sensors	The Greater of (+/–)				
psi	psi	mbar	inH_2O	mmH_2O	% of DP Reading
30	0.0005	0.04	0.014	0.4	0.035%
100	0.0015	0.10	0.04	1.0	
300	0.005	0.4	0.14	4.0	
1000	0.02	1.0	0.4	10.0	
3000	0.05	4.0	1.4	n/a	
10000	0.2	10.0	4.0	n/a	
15000	0.3	15.0	6.0	n/a	

or

Unit is enabled in CrystalControl

▶ **Without tare function:**

±(0.05% of static line pressure reading)

PRESSURE SENSOR

Wetted Materials: (WRENCH TIGHT) **316 stainless steel** — *All welded, with a permanently filled diaphragm seal.*

(FINGER TIGHT) **316 stainless steel and Viton® (internal o-ring)** — *Metal to metal cone seal; O-ring can be removed if necessary.*

Diaphragm Seal Fluid: **Silicone Oil** — *1/4" medium pressure tube system compatible with HIP LM4 and LF4 Series, Autoclave Engr SF250CX Male and Female Series.*

Connection: **Crystal CPF Female** — *1/4" male NPT adapter included unless BSP, M20, or 15KPSI is specified.*

BAROMETRIC REFERENCE (BARO)

Accuracy: **± 0.00725 psi, ± 0.5 mbar** — *Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.*

Range: **10.153 to 15.954 psiA, 700.0 to 1100.0 mbarA** — *Exposure to environmental extremes of temperature, shock, and/or vibration may warrant a more frequent recertification period.*

Units and Resolution: **psi** **0.001**
inHg **0.001**
mmHg **0.01**
mbar ..... **0.1** — *Other units available depending on the installed modules.*

Pressure Connection: **Cylindrical sensor fitting of 5.8mm OD. A flexible 4.8 mm [3/16"] ID tube is recommended to connect for for calibration.**

STANDARD DELIVERY

- HPC41 or HPC42
- ISO 17025 Accredited Calibration Certificate, NIST Traceable
- 4 x AA batteries
- Your choice of adapters (NPT, BSP, and M20)
- Protective Boot
- Test Leads, red and black with clips
- Velco strap
- User manual
- Mini-USB Cable

COMPLEMENTARY PRODUCTS

Crystal Engineering offers a wide range of products that work with the HPC40 Series:

- Fittings that connect without tools, safely and without leaks
- Lightweight, super flexible high pressure hoses
- Fitting kits and adapters
- Pneumatic hand pumps
- Hydraulic hand pumps
- Portable pressure comparators

CURRENT & VOLTAGE MEASUREMENT

Connection: **4 mm jacks**
Maximum Voltage: **45 VDC**

Current (mA) Input

Accuracy: **±(0.015% of rdg + 0.002 mA)**
mA Range: **0 to 55 mA**
Percent Range: **0-20, 4-20, 10-50**
Max Allowable Current: **60 mA**
Resolution: **0.001 mA or 0.01%**
Units: **mA and %**
Input Resistance: **< 17.2 Ω**
Voltage Burden @ 20mA: **< 0.35 V**
Voltage Burden @ 50mA: **< 0.86 V**
HART Resistor: **250 Ω**

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.

Inputs protected by a resettable fuse.

mA can be displayed as a percentage, where 0 to 100% corresponds to either 0 to 20, 4 to 20, or 10 to 50 mA.

Jacks are compatible with safety sheathed banana plugs.

Current (mA) Output

Accuracy: **± (0.015 of rdg + 0.002 mA)**
Range: **0 to 25 mA**
Step Time: **1 to 999 seconds**
Ramp Time: **5 to 999 seconds**

With internal or external loop supply.

Voltage (VDC) Input

Accuracy: **±(0.015 % of rdg + 2 mV)**
Range: **0 to 30 VDC**
Resolution: **0.001 VDC**
Input Impedance: **> 1 MOhm**

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.

Loop Power

Fixed Output: **24 VDC**
Voltage Output Accuracy: **± 10%**
Maximum Output Current: **25 mA**

Switch Test

Switch Type: **Dry Contact**
Closed State Resistance: **< 1K Ω**
Open State Resistance: **> 100K Ω**
Sample Rate: **10 Hz**

Switch test screen reports switch open, close, and deadband values.

TEMPERATURE MEASUREMENT

Accuracy: **±(0.015% of rdg) + 0.02 Ohm**

Includes all effects of linearity, hysteresis, repeatability, temperature, and stability for one year.

Range: **0 – 400 Ohms**

Resolution: **0.01 on all scales**

To order a non-calibrated sensor from -45 to 150 °C, order part number 127387. To order a system calibrated sensor, see the Ordering Information table on page 6.

Units: **°C, K, °F, R, Ω**

TCR: **0.003850 Ω/Ω/°C (IEC 60751)**

Wiring: **2-, 3-, and 4-wire support**

Connection: **Lemo Plug, 1S Series, 304 insert configuration**

The proper selection of the RTD sensing element is very important as the error associated with this device is the majority of the overall system measurement uncertainty. IEC 751 is the standard that defines the temperature versus resistance for 100Ω, 0.00385 Ω/Ω/°C platinum RTDs. IEC 751 defines two classes of RTDs: Class A and B. Class A RTDs operate over the -200 to 630°C range versus -200 to 800°C for the Class B elements. For example, the Class A uncertainty is about half that of the Class B elements as illustrated in the following table.

			Class A				Class B			
Temperature °C	HPC40 Series Uncertainty		Class A Uncertainty		HPC40 + Class A Uncertainty		Class B Uncertainty		HPC40 + Class B Uncertainty	
	±Ω	±°C	±Ω	±°C	±Ω	±°C	±Ω	±°C	±Ω	±°C
-200	0.02	0.05	0.24	0.55	0.24	0.55	0.56	1.30	0.56	1.30
0	0.04	0.09	0.06	0.15	0.07	0.17	0.12	0.30	0.12	0.31
200	0.05	0.13	0.2	0.55	0.21	0.56	0.48	1.30	0.48	1.31
400	0.06	0.17	0.33	0.95	0.33	0.96	0.79	2.30	0.79	2.31
600	0.07	0.21	0.43	1.35	0.44	1.37	1.06	3.30	1.06	3.31
800	0.08	0.25	0.52	1.75	0.53	1.77	1.28	4.30	1.28	4.31

DATA/COMMUNICATION

Digital Interface: **mini-USB**

The mini USB will power the HPC40 Series with or without the batteries installed.

DISPLAY

Screen: **320 x 240 pixel graphical display**

LCD readable in sunlight.

Display Rate: **3 readings/second (standard)**
10 readings/second (switch test and peak hi/lo modes)

TEMPERATURE SENSORS

We offer 2 complete system calibrated temperature sensors for HPC40 series, taking full advance of the "reference thermometer" like RTD input. Both sensors are 4 x 250 mm sensors with handle, cord, and LEMO connector., and ready to use with HPC40 Series.

T2: **-45 to 150 °C**

T3: **-45 to 400 °C**

T2 & T3 options are delivered with 17025 accredited system calibration certificate, combining HPC and temperature sensor uncertainties. Correction factors (CvD) will be calculated, and entered into the HPC40 Series.

POWER

Type	Cell Voltage
Alkaline	1.5 V
NiMH	1.2 V
Lithium	1.5 V

Battery Life: **>12 hours non-sourcing**
>8 hours when sourcing 12 mA
Uses 4 alkaline AA (LR6) batteries.

Recharge Time: **16 hours*** (Using Eneloop 2100 mA hr)

* Charging is done through USB , except when supplying loop power in mA, Int. Pwr. Mode.

ENCLOSURE

Weight: **689 g (24.3 oz)** *Weight is for dual sensor model with protective boot installed.*

Rating: **IP65** *LCD protected from impact damage by 0.5 mm (0.02") thick polycarbonate lens.*

Housing: **Machined Aluminum**

Keypad and Labels: **UV Resistant Silicone**

OPERATING TEMPERATURE

Temperature Range: **-20 to 50° C (-4 to 122° F)** *< 95% RH, non-condensing. No change in pressure, electrical, or temperature accuracy over operating temperature range. Gauge must be zeroed to achieve rated specification.*

STORAGE TEMPERATURE

Temperature Range: **-40 to 75° C (-40 to 167° F)** *Batteries should be removed if stored for more than one month.*

SPECIAL FEATURES

The following requires the use of our free CrystalControl software

Remove: **Unwanted pressure units.**

Auto Off: **Adjust automatic shutoff settings.**

Calibration: **Calibrate the modules and enter new Calibrated On and Calibration Due dates.**

User Defined Unit: **Define and display any pressure units not included, or to use the gauge to display force, level or other pressure related parameters.**

CERTIFICATIONS

HPC40 Series complies with the Electromagnetic Compatibility and the Pressure Equipment Directives.

HPC40 Series complies with the Australian Radiocommunications (Electromagnetic Compatibility) Standard 2008.

RANGE & RESOLUTION TABLE

P/N	Range (psi)	Over-pressure	Display Resolution psi	in H_2O	in Hg	mm Hg	mm H_2O	kg/cm²	bar	mbar	kPa	MPa
30PSI	30	3.0 x	0.001	0.01	0.001	0.01	1	0.0001	0.0001	0.1	0.01	
100PSI	100	2.0 x	0.001	0.1	0.01	0.1	1	0.0001	0.0001	0.1	0.01	0.00001
300PSI	300	2.0 x	0.01	0.1	0.01	0.1		0.001	0.001	1	0.1	0.0001
1KPSI	1000	2.0 x	0.01		0.1			0.001	0.001		0.1	0.0001
3KPSI	3000	1.5 x	0.1		0.1			0.01	0.01		1	0.001
10KPSI	10 000	1.5 x	0.1					0.01	0.01		1	0.001
15KPSI	15 000	1.3 x	0.1					0.01	0.01		1	0.001

(Add one digit of resolution for differential mode.)

CPF Adapter Fitting is not included.

ORDERING INFORMATION

Number of Sensors	–	1st Pressure Range P/N	/	2nd Pressure Range P/N	–	BARO Option	–	Adapter	–	Temperature Sensor
HPC41 ....(Single) HPC42 ..... (Dual)						No .... (omit) Yes... -**BARO**		1/4 NPT .. (omit) G 1/4 B.....-**BSP** M20x1.5 ...-**M20**		No .....(omit) PT100 Probe, -40 to 150 °C.... **-T2** STS050 Probe, -40 to 400 °C ... **-T3**

Sensors include 17025 System Calibration Certificate.

SAMPLE PART NUMBERS

HPC41-1KPSI ..... Single Sensor (1000 psi) HPC40 with a 1/4" NPT pressure fitting.

HPC42-3KPSI-10KPSI-BARO-BSP-T3 ... Dual Sensor (3000 psi/10 000 psi) HPC40 with the BARO option, a 1/4" BSP pressure fitting, and STS050 Probe temperature sensor.

HPC42-1KPSI-10KPSI-GWX-W ..... Dual Sensor (1000 psi/10 000 psi) HPC40 with a 1/4" NPT pressure fitting; a System G pump system; and a waterproof carrying case.

▶ **Ordering a Pump System Only**

Any pump system, carrying case, and connection fittings for an HPC40 Series calibrator may be ordered separately from the gauge. Enter HPC40-NONE followed by the Pump System part number and the Carrying Case option code.

SAMPLE PART NUMBERS

HPC40-NONE-GWX-W ..... System G pump system with a waterproof carrying case.

Pump System*	Carrying Case~
No Pump.... (omit)	
System A.... **-AXX**	Aluminum ... (omit)
System A.... **-AHX**	Waterproof..... **-W**
System B.... **-BXX**	
System B.... **-BHX**	
System C.... **-CXX**	
System C.... **-CHX**	
System D.... **-DOX**	
System D.... **-DWX**	
System E.... **-EOX**	
System F.... **-FOV**	
System F.... **-FWV**	
System G.... **-GOX**	
System G.... **-GWX**	
System H .... **-HOX**	

~ The Waterproof Case is an ***option*** for Systems A, B, and C only.

The Waterproof Case is ***the only option*** for Systems G and H.

AMETEK offers a variety of solutions for pressure generation and measurement. Our line of products for pressure generation includes everything from small pneumatic hand pumps to a precision, hydraulic pressure comparator capable of generating up to 15 000 psi / 1000 bar / 100 MPa.

All of our pumps may be ordered as part of a Pump System, complete with an HPC40 Series and delivered in a sturdy carrying case with custom insert.

* Refer to the following page for a more detailed description of each pump system.

PUMP SYSTEMS OVERVIEW

Pump System	Part Number	Pressure Range	Pneumatic	Hydraulic	Hand Pump	Bench Top	Included Pump	Case Options: Aluminum	Case Options: Waterproof (Pelican Case)
System A	AXX	0 to 30psi / 2 bar	■		■		 T-960-CPF	■	■
	AHX	0 to 580 psi / 40 bar	■		■		T-970-CPF	■	■
System B	BXX	-25 inHg to 30 psi / -0.85 to 2 bar	■		■		 T-965-CPF	■	■
	BHX	-27 inHg to 580 psi / -0.91 to 40 bar	■		■		T-975-CPF	■	■
System C	CXX	0 to 3000 psi / 200 bar		■ (Oil)	■		 T-620-CPF	■	■
	CHX	0 to 5000 psi / 350 bar		■ (Oil)	■		T-620H-CPF	■	■
System D	DOX	0 to 5000 psi / 350 bar		■ (Oil)		■	 P-018-CPF	■	
	DWX	0 to 5000 psi / 350 bar		■ (Water)		■		■	
System E	EOX	0 to 10 000 psi / 700 bar		■ (Oil)		■	 P014-CPF	■	
System F	FOV	0 to 15 000 psi / 1000 bar		■ (Oil)		■	 T-1-CPF	■	
	FWV	0 to 15 000 psi / 1000 bar		■ (Water)		■		■	
System G	GOX	0 to 15 000 psi / 1000 bar		■ (Oil)		■	 GaugeCalHP		■
	GWX	0 to 15 000 psi / 1000 bar		■ (Water)		■			■
System H	HOX	-27 inHg to 580 psi / -0.91 to 40 bar	■		■		 T-975-CPF (and)		■
		0 to 5000 psi / 350 bar		■ (Oil)	■		T-620H-CPF		■